

**PRIVILEGED AND CONFIDENTIAL
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MEMORANDUM

TO: David Small, Secretary

FROM: David L. Ormond, Jr., Deputy Attorney General *DJO*

RE: Bloom Energy Desulf Unit Waste

DATE: June 3, 2015

This Memorandum is to consolidate and update my legal analysis of this matter.

Background

My first involvement in this matter started with attendance at a meeting on January 22, 2015, with DNREC management and staff, and a number of representatives from Boom Energy ("Bloom"). The attendees included Bloom's outside attorney with a specialty in hazardous waste management, Michele Korash.

I accompanied DNREC on a tour of the Bloom manufacturing facility in Newark, on February 18, 2015. I communicated directly with Ms. Korash on the basics of confidentiality under FOIA in Delaware, and I have a copy of the letter to the Secretary dated March 12, 2015, from Ms. Korash.

I am in receipt of two Memorandums from DNREC staff, and have participated in various e-mail exchanges and internal discussions.

On receipt of a letter from DNREC staff dated December 9, 2014, opining that the manufacturing process unit exception should not apply, Bloom obtained temporary I.D. numbers for the Desulf Units, so that Bloom could manifested shipments of Desulf Units. On January 13, 2015, shipments of Desulf Units were manifested for each of the four sites at which Bloom servers are located in Delaware. This was done as an interim measure while the parties discussed the applicability of the manufacturing process unit exemption.

I have analyzed the legal issues based on the pertinent authorities and presentations by staff and by Bloom, and I have some limited experience with RCRA issues, but I must caution that I do not have any kind of comprehensive understanding of the numerous complexities and interrelationships involved in RCRA.

Legal Questions

- 1) Whether the Desulf Units fall within the manufacturing process unit exemption for Regulation of Hazardous Waste in § 261.4(c), which provides that hazardous waste generated in a “manufacturing process unit” is not subject to regulation as a hazardous waste.
- 2) Whether the Desulf Units contain solid waste and must be regulated as such.

Regulatory Facts

Desulf Units are a component of Bloom energy servers.

The servers produce electricity using solid oxide fuel cell technology to very efficiently and reliably convert natural gas to electricity. The servers convert natural gas into electricity through an electrochemical reaction without combustion.

Sulfur compounds are added to natural gas as a safety precaution, but they impede the function of the fuel cell. Desulfurization of the natural gas is one of the first steps in producing electricity in a server. There are three or four identical Desulf Units in a server.

The Desulf Units contain a sorbent material, which includes copper that can be reused.

The Desulf Units are engineered and designed to assure structural integrity during operation and while out of service. A leak has never been detected from one. They are built to last the life of the server, which is 15 years or more. They are made of extruded aluminum or zinc-plated steel, with a wall thickness of approximately 5 millimeters. They cannot be opened without special equipment and instructions. The bolts are torque in a particular sequence, and the gaskets are subjected to multiple pressure tests.

Every six to twelve months, approximately, the Desulf Units are removed from the servers for servicing. When removed from service, the natural gas is purged and a self-sealing mechanism automatically seals shut the piping manifolds for the natural gas so that the Desulf Unit is fully sealed and the contents cannot escape until purposefully removed.

Once the Desulf Units are removed from operation, they are moved to a central location. They are opened, emptied, cleaned, and refilled, before being returned to operation in a Bloom server. In the servicing, the copper (consisting of up to 30% of the material in the unit) is reclaimed and the residue shipped to a hazardous waste facility as hazardous waste. As soon as the Desulf Unit is opened, the residue is treated as hazardous waste, as would be required by the manufacturing process unit exemption.

The sulfur that is removed from the natural gas is not hazardous waste. However, a small amount of benzene that is typically present in natural gas is also absorbed. Some of the Desulf Units test below the toxicity characteristics for benzene.

Analysis

1. The Desulf Units can fall within the Manufacturing process unit Exemption

The manufacturing process unit exemption in, DNREC's *Regulations Governing Hazardous Waste*, 7 Del. Admin. C. § 1302 - 261.4(c)¹, provides that hazardous waste generated in a "manufacturing process unit" is not subject to regulation as a hazardous waste until one of two things occurs: 1) The hazardous waste is removed from the unit in which it was generated; 2) The hazardous waste remains in the unit for more than 90 days after the unit is removed from service.

Section 261.3 provides that a solid waste becomes a hazardous waste when it "first": 1) meets any of the listing descriptions; 2) becomes a mixture containing a hazardous waste; or 3) exhibits one or more of the listed characteristics. "The point of generation, however, may be a product or raw material storage tank, transport vehicle or vessel, or a manufacturing process unit." 45 F.R. 72024 (October 30, 1980). "Commentators on this issue provided several examples of units in which hazardous wastes are generated which currently appear to be, perhaps unnecessarily, subject to the regulations." 45 F.R. 72024-72025. "[E]xamples occur in a great many manufacturing processes, where the hazardous wastes are generated in process units, such as distillation columns, floatation units, . . . and in associated non-waste-treatment process units such as cooling towers." 45 F.R. 72025.

This exemption is grounded on public policy:

EPA did not intend to regulate . . . *manufacturing process units* in which hazardous wastes are generated. As represented by the above examples, most of these units are tank or tank-like units . . . which are designed and operated to hold valuable products or raw materials . . . during manufacturing. Because of their design and operation, these units are capable of holding, and are typically operated to hold, hazardous wastes which are generated in them, until the wastes are purposefully removed. Thus, these hazardous wastes are contained against release to the environment (except of course when abnormal circumstances such as fire or explosion occur) and the risks they pose to human health or the environment are very low and are only incidental to the risks posed by the valuable product or raw material with which they are associated.

45 F.R. 72025 (emphasis added). The reasoning for the exception is that the manufacturing process unit is inherently designed and operated to contain the hazardous waste with a reasonable degree of safety, until removal of the hazardous waste. The risk of release to the environment is low and incidental. Therefore, it is not necessary to regulate the hazardous wastes until they are removed.

There is also an element of common sense. In this context, during every moment of the manufacturing process, some amount of hazardous waste, however minute, is being produced.

¹ This exemption is identical to the corresponding exemption in 40 CFR 261.4(c).

As a practical matter, the waste can only be removed and treated as a hazardous waste at some reasonable intervals of time.

It appears that the risk posed by the Desulf Units to human health or the environment are very low and are only incidental to the risks posed by the natural gas and electricity manufacturing with which they are associated. As such, the Desulf Units fall squarely within EPA's rationale for the manufacturing process unit exemption.

In a Memorandum dated December 4, 2014, DNREC staff conclude that the Desulf Units should not meet the definition of manufacturing process unit in the exemption. In my view, staff's conclusion is not the better reading of the manufacturing process unit exemption.

Staff point out that the basis for the exemption is that a manufacturing process unit simultaneously holds both a raw material or product in addition to the hazardous waste. Here, staff focus on the sorbent material, and not the natural gas, and argue that the sorbent material is neither a raw material nor a product. One might be able to classify the sorbent material as a raw material that is used up in the manufacture of electricity, but more importantly, there is no reason that the natural gas cannot serve as the "raw material" in the manufacture of electricity here.

DNREC staff point to an EPA guidance document dated May 1990 (RO 13374). This does use rather broad language to state that the exception does not apply to a manufacturing process unit, that is stationary during operation, if the unit is disassembled for cleaning off-site.

On the other hand, I see no reason why the Desulf Unit should not be defined as the manufacturing process unit, rather than the fuel cell, so Bloom's manufacturing process unit is not disassembled before shipment, and RO13374 is not applicable.

Moreover, one must look at RO 13374 in context. It involved a heat exchanger. I find convincing the presentation by Bloom that a heat exchanger loses its structural integrity when disassembled for shipment, but the Desulf Units do not. RO 13374 states: "[The incentive to maintain the unit's structural integrity to prevent leaks or unintended releases of products is substantially reduced when the unit is taken out of operation. Likewise, there would be a loss of the unit's structural integrity if it were to be disassembled for off-site shipment, with a potential for hazardous waste releases."

In sum, I do not find RO 13374 dispositive or particularly persuasive as applied to the present context.

Also, Bloom claims that EPA has allowed cooling towers and floatation units to be shipped offsite, and that they retained the manufacturing process unit exemption until opened offsite.

Based on the foregoing, I see no reason why the Desulf Unit, as manufacturing process units, cannot be shipped off-site for cleaning and retain the exception until opened for cleaning off-site.

2. There is no clear legal authority requiring the Desulf Units to be treated as containing solid waste.

A. Spent Material, by product and reclamation

DNREC staff are of the opinion that the sorbent material is a "spent material." In a *Memorandum* dated December 4, 2014, page 3, DNREC staff states: "[O]nce the sorbent material can no longer effectively capture sulfur, it meets the definition of spent material, which is defined in [§] 261.1(c) . . . A spent material being reclaimed is a solid waste, as identified in Table 1 of [§] 261.2. As such, the waste is required to be managed in accordance with all applicable provisions of [the regulations] upon generation of the waste (i.e., when the sorbent material becomes spent and can no longer effectively capture sulfur.)"

Bloom takes the position that sorbent material is not a spent material, but is instead a byproduct. A by-product is "a material that is not one of the primary products of a production process and is not solely or separately produced by the production process." § 261.1(c)(3).

A byproduct being reclaimed is not a solid waste and is thus not subject to regulation. *See* § 261.1(a). Reclamation removes certain materials from the definition of solid waste. § 261.1(c)(3).

A material is "reclaimed" if it is processed to recover a usable product, or if it is regenerated. Examples are recovery or lead batteries . . .

§ 261.1(c)(4). "Bloom Energy's reclamation of copper from the [Desulf Units] is similar to the reclamation of lead from batteries." *Ms. Korash letter to the Secretary*, dated March 12, 2015, page 17, n. 21.

The reclamation status also impacts the time of generation, which is when regulation begins. "Even at that point [where the Desulf Units are opened], copper in the filters is often reclaimed, such that the waste is not generated until the reclamation process is complete." §§ 261.1(c)(3) and (4). *Id.*, page 8 n.16.

DNREC staff are of the opinion that a material cannot be considered a byproduct if it meets the definition of a spent material. DNREC staff *Memorandum* dated March 23, 2015, page 7. Staff find significance in the preamble to the final rule defining solid waste, which I read but do not appreciate any real significance in the language.

RCRA is rife with complexities, and interrelationships of definitions, such as the foregoing. I cannot definitively evaluate the relative strengths of these competing claims without further analysis and information. Bloom mentions that it has not provided detailed analysis on this issue but has offered to do so. *Ms. Korash letter to the Secretary*, dated March 12, 2015, page 17, n. 21.

B. Carbon Canisters

By *Memorandum* dated April 27, 2015, DNREC staff found significant certain EPA guidance on carbon canisters, RO 14331. EPA found that the filter elements, while meeting the definition of

“spent material,” also meets the definition of “sludge,” which is a more narrow definition than that of “spent material.” “Sludge” can only come from wastewater treatment or an air pollution control device, and evidently carries with it significant exemptions from regulation.

DNREC staff state: “In order to get to that discussion, EPA had to first conclude the waste was subject to regulation (i.e., not exempt via the manufacturing process unit exemption).” I do not agree. There are any number of scenarios other than this unstated or implied conclusion by EPA.

I strongly suspect that EPA, much like a judge, tends to construe the pending question as narrowly as possible, to avoid answering abstract questions and to avoid application of the answer too broadly in other unanticipated contexts. It is possible that the company requesting the guidance has some motivation to not to ask about the manufacturing process exemption, or perhaps the company was not aware that the manufacturing process exemption could be construed to cover its situation. Furthermore, without a detailed comparison between the carbon canisters at issue in RO 14331 and the Desulf Units, it is difficult to judge the analogous value of the guidance.

C. EPA Guidance RO 14309

DNREC staff has directed you to RO 14309. This guidance is expressly limited to corrective action. The precise question asked is: “Are manufacturing process units holding a hazardous waste considered SWMUs for the purposes of corrective action under RCRA Section 3004(u)[42 U.S.C. § 6924]?”

(u) Continuing releases at permitted facilities

Standards promulgated under this section shall require, and a permit issued after November 8, 1984, by the Administrator or a State shall require, corrective action for all releases of hazardous waste or constituents from any solid waste management unit at a treatment, storage, or disposal facility seeking a permit under this subchapter, regardless of the time at which waste was placed in such unit. Permits issued under section 6925 of this title shall contain schedules of compliance for such corrective action (where such corrective action cannot be completed prior to issuance of the permit) and assurances of financial responsibility for completing such corrective action.

DNREC staff finds significance in the heading to §261.4(c), as indicating the materials in the manufacturing process unit are still hazardous wastes but just not subject to hazardous waste management standards found in certain other provisions. Thus, the material must be solid wastes, because something can’t be a hazardous waste without first being considered a solid waste. This is a classic RCRA interrelationship, but I am not convinced that it is all that clearly applied with reference to a regulatory exception grounded in public policy such as the manufacturing process unit exemption.

It remains unclear to me whether EPA would intend to treat exempt manufacturing process units as SWMUs, beyond corrective action, for other more routine regulatory requirements, like

collection and transport. This appears to be a slender reed, indeed, to support a requirement that Bloom treat the Desulf Units as transporting solid waste.

The manufacturing process units exemption was added in 1980 to provide relief for instances when, among others, the point of hazardous waste generation could be the manufacturing process unit itself, because of the inherent, minimal risk to the environment and public health until the manufacturing process units is opened up.

It seems to make little sense, then, for a centralized collection point for manufacturing process units to need a permit as a solid waste transfer station, for example. The concluding sentence, then, in RO 14309, seems all the more significant: "However, EPA may exercise differing statutory authority to require cleanup at the facility."

If DNREC's concern is transport security, perhaps Bloom would voluntarily agree to some transport protocol without having to accept the conclusion that the Desulf Units hold solid waste subject to regulation during transport.

Conclusion

If Bloom's desulfurization canisters are designed and operated to contain the hazardous waste with a reasonable degree of safety, the risk of release to the environment is low and incidental, and it is impractical and unnecessary to regulate the hazardous wastes until they are removed, then the desulfurization canisters should probably qualify under the manufacturing process unit exemption under § 261.4(c). It is unclear without further analysis whether Bloom should be required to treat the Desulf Canisters as containing (and thus transporting) solid waste.

